

UPDATED 4/1/05: The following information may be useful for applicants to propose methods of compliance with § 25.856. We intend to add this information to AC 25.856-1X when it is issued.

Tests of insulation bonded to substrates (e.g., backs of interior panels, ducts, skin): When insulation is bonded to a substrate that, by itself, would not have to comply with §25.856(a), it is acceptable to qualify the insulation bonded to a thin sheet of aluminum (~0.060"). It is then acceptable to bond it to an arbitrary panel or substrate without further qualification (again, provided that substrate by itself doesn't have to meet §25.856).

Insulation adhered to substrates with double-backed tape can also be substantiated with the insulation taped to thin aluminum sheet, as discussed above.

Pass/Fail Criteria: There are three potential ways (one for flame propagation and two for after-flame) to address sample failures, and establish that the material combination does, in fact, meet the intent of the rule.

If there is a failure of one sample for flame propagation, additional samples may be tested to substantiate that the failed sample was not representative. Test a minimum of 7 additional samples, none of which can fail. In addition, the average of all the samples, including the failed sample, must be below the pass/fail limits. Depending on the initial test results, it may require more than 10 total samples to bring the average down.

If the material combination fails the after-flame time, it may be due to a random sample construction or test conduct issue, or it may be an artifact of the specific burner exposure time. This situation can be addressed in one of two ways, depending on the reason for the failure(s).

1. Test a minimum of 7 additional samples, all of which must satisfy the flame propagation requirements. If the average of all the samples' after-flame time is 3 seconds or less, the material combination can be used.
2. Expose the pilot burner for 30 seconds during the test (rather than 15 as prescribed). If the material combination then satisfies both pass/fail criteria, the material combination can be used.

Hook and Loop: Hook and loop only needs to be tested with specific films, or whatever it's directly bonded to. The core, or any substrate below the immediate outside material can be a standard material. This is because the core materials must be tested in the basic sample test, so repeating it for hook and loop is not necessary. This should reduce the number of combinations requiring test. The intent of the hook and loop "mated" test is that the tip of the burner flame impinges on the junction of the hook and loop. The top surface of a 1" thick blanket is at the normal position relative to the radiant panel in this configuration. Samples should be no more than 1". The actual thickness can be used if it's thinner than 1", but the junction of the hook and loop should be kept at the same place relative to the burner. There has been some discussion also that this test results in test of the edge closure of the blanket itself. This is not the intent, but depending on how

the edge is closed for the test, could have an impact. It should be possible to simply fold the film material over, and staple the remaining three sides to form the sample. This would eliminate the "edge". Additionally, hook and loop tested mated between blankets can then be attached via hook and loop to any other substrate, similar to the bonded materials.

Tape: The AC suggests a very specific tape configuration, to permit arbitrary use of tape. However, many manufacturers have very specific ways they install tapes and don't want to address arbitrary usage. It is acceptable to test the actual configuration. However, this won't necessarily qualify general use of tape on that material. Question also came up regarding the 2" width. The intent is to use 2" (nominal) wide strips. If the actual tape is wider, it should be cut down to approximately 2". If it's narrower, then use the actual width. Once qualified individually, tapes could be used in combination without further testing.

Damping materials: It is recommended that damping materials covered with an aluminum sheet be tested in a configuration similar to that for hook and loop, such that the tip of the pilot burner impinges on the interface of the damping material and an aluminum substrate. However, the regulation is specific regarding the test sample and location of the pilot flame, so it is acceptable to test that way also, i.e., test on the interface is not required. For damping that does not have an aluminum face sheet, the standard test configuration is also the recommended configuration.

Six-sided box: The rule applies to insulation in the fuselage, whether or not it might be considered "accessible". However, insulation inside the walls of an enclosed box, such as an oven, galley cart, coffee maker, can be considered acceptable by equivalent safety. Ventilated boxes, especially those that vent to the inaccessible areas, require assessment, but the general equivalency wouldn't apply. We'll add specific examples in the AC so that repeated findings aren't necessary.

Insulation inside a class C cargo compartment: Insulation that is within a class C cargo compartment, and therefore contained by the cargo liner, can be considered equivalently safe, without testing per 25.856.

Insulation in the cabin: Insulation in the cabin, that is visible and accessible with hand fire extinguisher may be considered to satisfy § 25.856(a) via equivalent level of safety finding, if the insulation also complies with § 25.853. This provision would not include insulation that requires access through a door or panel or is otherwise not visible and accessible. Curtains and carpet pad are not considered "insulation" for the purposes of § 25.856(a), regardless of their thermal or acoustic properties.

Compliance with § 25.853: Thermal/acoustic insulation that meets § 25.856(a) can be considered equivalently safe for the purposes of showing compliance with § 25.853. Since most airplanes do not have amendment 25-111 in their certification basis, compliance with § 25.853 is still required. However, once compliance with § 25.856(a)

has been shown, it is not necessary to test in accordance with § 25.853, and this requirement can be substantiated on based on equivalent safety.